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EXAMINER

WOZNIAK, JAMES S

ART UNIT	PAPER NUMBER
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2626

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/723,851

Applicant(s)

MAHE ET AL.

Examiner

James S. Wozniak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5, 9, and 11 is/are rejected.
- 7) ☒ Claim(s) 6-8, 10, and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to because the spelling of equalization, centre, symmertisation and other forms thereof, should be corrected to --equalization--, --center--, --symmertisation-- and corresponding forms thereof (*equalizer, equalize, equalizing, etc.*).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

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2. Figures 1-9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated (*see the background of the invention in the specification*). See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities:

The specification is objected to because the spelling of equalization, centre, symmertisation and other forms thereof, should be corrected to --equalization--, --center--, --symmertisation-- and corresponding forms thereof (*equalizer, equalize, equalizing, etc.*).

Appropriate correction is required.

Claim Objections

4. **Claims 6-8 and 12** are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim *cannot depend from any other multiple dependent claim*. See MPEP § 608.01(n). Accordingly, the claim has not been further treated on the merits.

5. **Claims 1-5 and 9-11** objected to because of the following informalities:

Claims 1-5 and 9-11 are replete with antecedent basis issues, for example:

In claim 1, Line 2, "the voice" should be changed to --a voice--.

In claim 1, lines 4-5, "the actual distortion of the transmission chain" should be changed to --an actual distortion of a transmission chain--.

In claim 1, Lines 8-9, "the long-term spectrum of the voice signal of the speakers" should be changed to --a long-term spectrum of the voice signal of speakers--.

In claim 4, Line 5, "the mean pitch" should be changed to --a mean pitch--.

In claim 9, Line 5, "the ratio" should be changed to --a ratio--.

In claim 10 Lines 7-8, "the respective partial cepstra" should be changed to --respective partial cepstra --.

These and any additional antecedent basis issues require correction.

In the final limitation of claim 1, "the equalization of the digitized signal of the voice of the speaker carried out with," should be changed to --Carrying out equalization of the voice of the speaker with,-- in order to more clearly represent this limitation.

Equation reference numbers (*i.e.*, 0.3 and 0.13) in Claims 9 and 10 should be deleted.

The spelling of equalization, centre, and other forms thereof, should be corrected to --equalization--, --center--, and corresponding forms thereof (*equalizer, equalize, equalizing, etc.*).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. **Claim 9** recites “means (400) of processing the signal...” but lacks additional means for enabling the operations that the processing means performs.

A single means claim, i.e., where a means recitation does not appear in combination with another recited element of means, is subject to an undue breadth rejection under 35 U.S.C. 112, first paragraph. In re Hyatt, 708 F.2d 712, 714-715, 218 USPQ 195, 197 (Fed. Cir. 1983) (A single means claim which covered every conceivable means for achieving the stated purpose was held nonenabling for the scope of the claim because the specification disclosed at most only those means known to the inventor.). When claims depend on a recited property, a fact situation comparable to Hyatt is possible, where the claim covers every conceivable structure (means) for achieving the stated property (result) while the specification discloses at most only those known to the inventor.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 1-2, 5/1, 5/2, and 9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahé et al ("*Correction of the Voice Timbre Distortions on Telephone Network*," 2001) in view of Ittycheriah et al (*U.S. Patent: 5,895,447*).

With respect to **Claim 1**, Mahé discloses:

A method of correcting spectral deformations in the voice, introduced by a communication network (*restoring voice timbre distortion in transmission, Abstract*), comprising an operation of equalization on a frequency band (F1-F2), adapted to the actual distortion of the transmission chain (*equalization performed on a specific frequency band, Section 3.3*), this operation being performed by means of a digital filter having a frequency response which is a function of the ratio between a reference spectrum and a spectrum corresponding to the long-term spectrum of the voice signal (*Section 3.2*), principally characterized in that it comprises:

A voice reference corresponding to a speaker (*long-term spectrum reference, Section 3.2*); and

The equalization of the digitized signal of the voice of the speaker carried out with, as a reference spectrum, the voice reference of the speaker (*equalizer utilizing an average long-term spectrum of a particular speaker, Section 3.2*).

Although Mahé discloses a process to compensate for channel effects based on a long-term spectrum average for a particular speaker, Mahé does not teach the use of a generic spectral average based on a class to which a speaker belongs. The use of a generic speaker classification for performing subsequent speech processing (*equalization in the case of Mahé*), however, is

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well known in the art. Specifically Ittycheriah recites speaker class dependent models used to identify the class of a particular speaker and perform further speech processing based on that determination (*Col. 5, Line 59- Col. 6, Line 10; and Col. 7, Lines 39-50*).

Mahé and Ittycheriah are analogous art because they are from a similar field of endeavor in speech signal processing. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Mahé with the concept of using speaker class dependent models as taught by Ittycheriah in order to reduce computational overhead and memory requirements due to performing class-dependent related speech processing instead of speaker-dependent processing (*Ittycheriah, Col. 2, Lines 22-31; and Col. 8, Lines 34-42*).

With respect to **Claim 2**, Ittycheriah further discloses:

The constitution of classes of speakers comprises:

Classification of a corpus of N speakers in order to obtain K classes (*speaker clustering used to form speaker classes, Col. 6, Lines 11- Col. 7, Line 20*); and

Voice data for each class (*Col. 5, Line 59- Col. 6, Line 10*),

While Mahé recites voice reference data in the form of an original speech cepstrum limited to an equalization band (*Sections 3.1-3.3*) and a long-term reference spectrum average used to perform equalization (*Section 3.2*).

With respect to **Claim 5/1 and 5/2**, Mahé discloses a pre-equalizer having a frequency response corresponding to the inverse of a reference spectral deformation introduced by a telephone connection (*Sections 2 and 3.1*).

With respect to **Claim 9**, Mahé discloses:

A system for correcting voice spectral deformations introduced by a communication network (*system for restoring voice timbre distortion in transmission, Abstract*), comprising adapted equalization means in a frequency band (F1-F2) (*equalization performed on a specific frequency band, Section 3.3*) which comprise a digital filter (300) whose frequency response is a function of the ratio between a reference spectrum and a spectrum corresponding to the long-term spectrum of a voice signal (*equalization filter, Sections 3.2-3.3*), principally characterized in that these means also comprise:

Means (400) of processing the signal for calculating the coefficients of the digital signal provided with: a first signal processing unit (400A) for calculating the modulus of the frequency response of the equalizer filter restricted to the equalization band (F1-F2) according to an equation similar to the one set forth in claim 9, with the exception of the inclusion of speaker class data (*Sections 3.2-3.3*);

A second processing unit (400B) for calculating the pulsed response from the frequency response modulus thus calculated, in order to determine the coefficients of the filter (*deriving a filter impulse response, Section 3.3*).

Although Mahé discloses a process to compensate for channel effects based on a long-term spectrum average for a particular speaker, Mahé does not teach the use of a generic spectral average based on a class to which a speaker belongs. The use of a generic speaker classification for performing subsequent speech processing (*equalization in the case of Mahé*), however, is well known in the art. Specifically Ittycheriah recites speaker class dependent models used to identify the class of a particular speaker and perform further speech processing based on that determination (*Col. 5, Line 59- Col. 6, Line 10; and Col. 7, Lines 39-50*).

Mahé and Ittycheriah are analogous art because they are from a similar field of endeavor in speech signal processing. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Mahé with the concept of using speaker class dependent models as taught by Ittycheriah in order to reduce computational overhead and memory requirements due to performing class-dependent related speech processing instead of speaker-dependent processing (*Ittycheriah, Col. 2, Lines 22-31; and Col. 8, Lines 34-42*).

10. **Claims 3 and 5/3** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahé et al in view of Ittycheriah et al, and further in view of Manley et al (*U.S. Patent: 4,310,721*).

With respect to **Claim 3**, Mahé in view of Ittycheriah discloses the speech equalizer utilizing speaker classes, as applied to Claim 2. Although Ittycheriah further discloses clustering speaker data into center (mean) reference values to represent an entire speaker class (*Col. 8, Lines 34-49*) and Mahé discloses reference cepstrums limited to an equalization band, as applied to Claim 2, Mahé and Ittycheriah do not explicitly disclose performing a Fourier transform on a cepstrum to obtain spectrum data. Such a transform is well-known in the speech processing art, however, as is evidenced by the Manley reference (*Col. 2, Line 65- Col. 3, Line 5*).

Mahé, Ittycheriah, and Manley are analogous art because they are from a similar field of endeavor in speech signal processing. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Mahé in view of Ittycheriah with the cepstrum transform taught by Manley in order to obtain reference spectrum data required for equalization and production of a speech output (*Manley, Col. 3, Lines 1-2*).

With respect to **Claim 5/3**, Mahé discloses a pre-equalizer having a frequency response corresponding to the inverse of a reference spectral deformation introduced by a telephone connection (*Sections 2 and 3.1*).

11. **Claims 4, 5/4, and 11/9** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahé et al in view of Ittycheriah et al, and further in view of Miyame et al (*U.S. Patent: 5,123,048*).

With respect to **Claim 4**, Mahé in view of Ittycheriah discloses the speech equalizer utilizing speaker classes, as applied to Claim 2. Although Ittycheriah further discloses clustering speaker data into center (mean) reference values to represent an entire speaker class (*Col. 8, Lines 34-49*) and Mahé discloses reference cepstrums limited to an equalization band, as applied to Claim 2, Mahé and Ittycheriah do not explicitly disclose speaker classification based on a mean pitch. Such a classification parameter is well-known in the speech processing art, however, as is evidenced by the Miyame reference (*talker recognition employing average pitch, Col. 4, Line 63- Col. 5, Line 8*).

Mahé, Ittycheriah, and Miyame are analogous art because they are from a similar field of endeavor in speech signal processing. Thus, it would have been obvious to a person of ordinary skill in the art, at the time of invention, to modify the teachings of Mahé in view of Ittycheriah with the use of a mean pitch parameter taught by Miyame in order to provide a defining parameter that is unique to particular speakers (*Miyame, Col. 4, Line 63- Col. 5, Line 8*).

With respect to **Claim 5/4**, Mahé discloses a pre-equalizer having a frequency response corresponding to the inverse of a reference spectral deformation introduced by a telephone connection (*Sections 2 and 3.1*).

Claim 11/9 contains subject matter similar to Claim 4, and thus, is rejected for the same reasons.

Allowable Subject Matter

12. **Claims 10 and 11/10** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter:

With respect to **Claim 10**, the prior art of record fails to explicitly teach or fairly suggest, either individually or in combination, a system for correcting spectral voice deformations resulting from a transmission channel with an equalization filter defined by the equation recited in Claim 9, wherein a partial cepstrum for a particular speaker class center is calculated according to the equation recited in claim 10 and is then transformed by a DFT in order to calculate the modulus of a frequency band.

Although Mahé discloses calculating a partial cepstrum for use in an equalization process as pointed out in the above rejections, Mahé fails to teach the use of the equation defined in claim 10 to calculate a partial cepstrum for a particular speaker class center.

Claim 11/10 further limits Claim 10, and thus, also contains allowable subject matter.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Lee et al (*U.S. Patent: 5,727,124*)- discloses a means for correcting channel distortion using cepstral mean subtraction.

Mammone et al (*U.S. Patent: 5,839,103*)- teaches a speaker verification system capable of reducing channel effects.

Huszar et al (*U.S. Patent: 5,862,156*)- discloses a speech decoder/equalizer.

Mokbel et al (*U.S. Patent: 5,905,969*)- teaches a method for blind equalization of a telephone speech signal.

DeJaco et al (*U.S. Patent: 5,915,235*)- discloses an adaptive equalizer for mobile telephone speech.

Mauuary et al (*U.S. Patent: 6,157,909*)- teaches a method for blind equalization of transmission channel effects.

Rydbeck et al (*U.S. Patent: 6,216,107*)- discloses performing a specific type of equalization based on a determination of full/half rate.

Higgins et al (*U.S. Patent: 6,266,633*)- discloses a method for channel equalization of a noisy voice signal.

Lee et al ("*A Frequency Warping Approach to Speaker Normalization*, 1998)- discloses a method for cepstral mean normalization to compensate for differences in convolutional distortions that may arise from speaker and channel differences.


Moreno et al ("*Continuous Recognition of Large-Vocabulary Telephone-Quality Speech*," 1999)- discloses the use of an equalizer in a telephone speech application.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James S. Wozniak whose telephone number is (571) 272-7632. The examiner can normally be reached on M-Th, 7:30-5:00, F, 7:30-4, Off Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached at (571) 272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James S. Wozniak
5/22/2007


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